



**Nine days**

Photographs paint a portrait of a busy crew during the recent nine-day mission. Photos on Page 3.



**Orbiter overhead**

Employees had a chance to watch *Columbia* fly over JSC on its way for a California tuneup. Photo on Page 4.

# Space News Roundup

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## Center must reduce energy use

Cohen takes steps to reverse rising trend

By Kelly Humphries

A new presidential order has put JSC on notice that it will have to cut energy use by 20 percent by the year 2000, and JSC Director Aaron Cohen took steps Tuesday to reverse the center's increasing energy use trend.

Cohen announced an energy conservation plan that establishes a JSC energy manager to coordinate overall energy reduction planning and implementation.

Dennis Klekar of Center Operations'

Plant Engineering Division has been appointed to fill the new post, said COD Director Ken Gilbreath.

In addition, energy conservation managers will be appointed in each directorate, program and project office to develop strategies, monitor progress, report results and work with the JSC energy manager. Energy conservation coordinators will be assigned in each division-level organization to develop innovative concepts for local control measures and to assure implementation.

All of the conservation managers and coordinators should be appointed, organized and conducting meetings by the end of September, Gilbreath said.

"This energy policy places the responsibility for energy conservation on each of us as individuals," Cohen said. "Energy conservation is best accomplished by *you* and *me*. No other person has the visibility that we do. I am asking for a renewed commitment from each of you to do your part to help reduce unnecessary utility energy

expenditures. The savings realized through our energy conservation efforts will benefit JSC, as well as the agency and our nation."

The urgency of the new conservation actions stems from a presidential executive order signed April 17 that requires federal agencies to reduce energy consumption by 20 percent by the year 2000, with 1985 as the base year. It follows 1988's Public Law 100-615 that requires energy reductions of 10

Please see **ENERGY**, Page 4



Dennis Klekar

## Discovery chomping at the bit

By James Hartsfield

Less than 17 hours after *Atlantis* ended its 3.6 million-mile journey on Kennedy Space Center's runway — only five miles from where the trip began — *Discovery* was rolled to the starting gate in preparation for STS-48.

*Discovery* arrived at Launch Pad 39A at 8:19 a.m. CDT Monday, and the Upper Atmosphere Research Satellite it will put in orbit was installed Wednesday. The crew of STS-48 — Commander J. O. Creighton, Pilot Ken Reightler and Mission Specialists Jim Buchli, Sam Gemar and Mark Brown — will travel to KSC on Monday for the Terminal Countdown Demonstration Test, a standard countdown dress rehearsal on the pad.

All preparations for STS-48 remain on schedule for a Sept. 12 night launch. Meanwhile, *Atlantis* was towed from the runway to Bay 2 of the processing hangar Sunday afternoon. Initial inspections of the spacecraft showed it suffered minimal damage during the nine-day flight, and only four of its heat-shielding tiles will need to be replaced.

But following a power down of *Atlantis* early Tuesday, two of the three onboard electricity-generating fuel cells were found to be still operating. The fuel cells apparently operated at a very low output for 13 hours, and engineers are assessing any damage that may have been caused by the mishap. Regardless, the two fuel cells will be replaced with spares on hand at KSC with no impact to the timetable for *Atlantis*' next launch on STS-44 in mid-November.

Please see **BOARD**, Page 4



Photo by Bob Walck

STS-43 Pilot Mike Baker gives over-and-under handshakes to Katrina, left, and Christopher Guerra following the welcome home ceremony at Ellington Field on Sunday.

## Chill may fix what ails Galileo

By Kari Fluegel

Galileo watchers may have some news as early as today regarding whether the spacecraft's high gain antenna cold bath loosened the pins that will free the antenna's stuck ribs.

The fate of the Jupiter-bound spacecraft has been in question since April when managers at NASA's Jet Propulsion Laboratory determined that two to four of the 18 ribs in the umbrella-like mechanism had not freed themselves from the stowed position. The stuck ribs also constrained the remainder of the antenna from deploying.

To correct the problem, controllers at JPL last week sent commands to Galileo to point the antenna away from the Sun to allow the metal parts of the mechanism to shrink in the

cold of space. The cold soak lasted about 50 hours. A previous shorter cold soak did not free the antenna.

The Galileo team hopes to have some early indications about the success of the maneuver today, however, confirmation will not come until after a wobble test next week.

Controllers will be able to tell from the test results if the cold soak procedure worked because the spacecraft will move differently.

Pending the outcome of that test, the antenna drive motors will be turned on again to complete the antenna deploy. That event however, will not take place until after the encounter with the asteroid Gaspra on Oct. 29.

Galileo was deployed from the Space Shuttle *Atlantis* in October of 1989.

## Crew credits 'top-notch' support work

By Kelly Humphries

Mission Specialist David Low told STS-43 friends, family and co-workers a "thought-provoking" story Sunday at the crew's Ellington Field homecoming celebration.

It seems most of the crew was up past its bedtime the night before Sunday's landing at Kennedy Space Center's Shuttle Landing Facility, floating around, eating dinner and watching the world go by. At one point, Mission Specialist Shannon Lucid asked where *Atlantis* was, and someone answered that it was off the coast of Chile.

"Shannon said, 'Okay, I'll stay up and watch South America go by and then I'll go to sleep,'" Low reported. The casual comment near the end of the 8 day, 21 hour and 21 minute mission, made him think:

"We had been in space for nine days, and we had started to take that for granted," he said. "We were five of the most incredibly privileged people in the world to be able to see this world from that perspective. It really is an absolutely beautiful world, and that's the thing that every one of us takes home with us."

The five-person STS-43 crew brought it home at 7:23 a.m. CDT Sunday with a nearly flawless touchdown and rollout. Post-flight inspection showed that two plies of one main landing gear tire had been worn off and that only minimal thermal protection system tile damage had been suffered during the flight.

Along the way, the crew deployed Tracking and Data Relay Satellite-E, which will become TDRS-West and a primary shuttle communications satellite after its 60- to 90-day checkout, and brought back data from four payload bay experiments, eight middeck payloads, 13 detailed test objectives and nine detailed supplementary objectives, many of them aimed specifically at conducting extended duration missions in space.

The crew is scheduled to present an all-hands briefing for employees from noon-1:30 p.m. Wednesday in Teague Auditorium.

"We salute you for your professionalism and for your contribution to the nation's space effort," said JSC Director Aaron Cohen, noting that their Mercury capsule- Please see **ATLANTIS**, Page 4



## Apollo 15 astronaut Jim Irwin dies

Gravesite services for former Apollo astronaut James B. Irwin, one of only 12 men who have walked and six who have driven on the Moon, were held Thursday at Arlington National Cemetery.

Pall bearers at the military honors ceremony included his Apollo 15 crewmates, David Scott and Al Worden, former Apollo astronauts Buzz Aldrin, Alan Bean and Gene Cernan, and former Skylab astronaut Bill Pogue.

Irwin and Scott, his companion on the lunar surface, were the first to use the lunar rover that extended the astronauts' explorations of the lunar surface. The 20th anniversary of the first use of the "moon buggy" occurred just four days before Irwin's death.

At the end of the first day of exploring the lunar highlands, Irwin quoted scripture, saying "I'll look unto the hills from whence cometh my help," and added quickly,

"but, of course, we get quite a bit from Houston, too."

Irwin, 61, who in the years following his 1971 Apollo 15 mission founded the evangelical High Flight Foundation and searched for Noah's Ark on Mount Ararat, died Aug. 8 in Glenwood Springs, Colo., apparently of a heart attack.

"The astronaut corps is deeply saddened by the untimely death of Jim Irwin," said Richard Covey, acting deputy chief of the Astronaut Office. "Amongst those of us fortunate enough to fly in space, he was part of a special group — those who traveled to the Moon. Both as an astronaut and with his High Flight Foundation activities, Jim was an inspiration to us all. We will miss him."

A memorial service was held Monday at the Nassau Bay Baptist Church. He is survived by his wife, Mary Ellen; children Joy, Jill, James, Jan and Joe; mother, Elsa Irwin; and brother, Chuck.



Irwin



Astronaut Jim Irwin gives a military salute at the Apollo 15 Hadley-Apennine landing site.

NASA Photo

JSC

# Ticket Window

The following discount tickets are available for purchase in the Bldg. 11 Exchange Gift Store from 10 a.m.-2 p.m. weekdays.

General Cinema (valid for one year): \$4.  
 AMC Theater (valid until May 1992): \$3.75.  
 Loews Theater (valid for one year): \$4.  
 Astroworld (valid 1991 season): season, \$44.94; child less than 4-feet, \$10.12; one day, \$15.85; Waterworld, \$8.15.  
 Seaworld of Texas (valid 1991 season): child (3-11), \$12.25; adult, \$17.25; (2-day) child \$15.95; adult, \$21.95.  
 Six Flags (valid until Nov. 17): adult (1 day) \$15.95, (2-day) \$20.95; child under 4 feet, \$14.95.  
 NASA Ski Week (Jan. 4-11, Big Sky Montana Resort, includes airfare, shuttle transfers, 6 day lift pass, 7 nights lodging): 2/Rm. \$744/person; 3/Rm. \$685/person; 4/Rm. \$656/person; \$100 deposit due by Aug. 15.  
 Deep sea fishing (Sept. 21): fishing, \$45; riding, \$20.

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# Gilruth Center News

**Sign up policy**—All classes and athletic activities are first come, first served. Sign up in person at the Gilruth Center and show a badge or EAA membership card. Classes tend to fill up four weeks in advance. For more information, call x30304.

**Defensive driving**—Course is offered from 8 a.m.-5 p.m., Oct. 12 or Nov. 16. Cost is \$15.

**Aerobic dance**—High/low-impact classes meet from 5:15-6:15 p.m. Tuesdays and Thursdays. Cost is \$24.

**Exercise class**—Low-impact class meets from 5:15-6:15 p.m. Monday and Wednesday nights. Cost is \$24.

**Weight safety**—Required course for employees wishing to use the Gilruth weight room. The next classes will be from 8-9:30 p.m. Sept. 5 and Sept. 18. Cost is \$5; preregistration required.

**Country and western dancing**—Beginning class will meet from 7-8:30 p.m. Mondays, starting Sept. 9; intermediate class meets from 8:30-10 p.m. Mondays beginning Sept. 9. Cost of six-week course is \$20 per couple.

**Aikido**—Martial arts class meets Tuesdays and Fridays from 6:30-7:30 p.m. for four weeks starting Sept. 3. Cost is \$35.

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# Technical Library News

The following selections are now available in JSC's Technical Library, Bldg. 45, Rm. 100.

*International Symposium on Long-Range Sound Propagation*. NASA, 1990. QC233 .F68 1990.

*Spatial Interferometry in Optical Astronomy*. Daniel Y. Gezari, 1990. QC411 .G49 1990.

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# Swap Shop

## Property

Sale: Friendswood, 3-2-2, lg den, lg deck, garden, landscaping, storm windows, FHA assum, \$83.9K. x34072 or 482-7607.

Rent: Highland Meadow/Scarsdale, 3-2-2, sun deck, outside storage, FPL, refrig, inside util, window coverings, \$650/mo. x32084 or 992-1448.  
 Lease: Nassau Bay, 4-2.5-2, FPL, lake waterfront, 3000 sq ft, avail Oct 1, \$2K/mo. Phil. x37892 or 333-9518.

Rent: Pearland, 3-2-2, 1.8K sq ft, fans, skylight in LR, lg fenced yard, no pets, \$650/mo plus dep. x34771 or 480-9036.

Rent: Jamaica Beach, avail 8/9-15, 8/23-30, 9/2-on. 286-8558.

Lease: Webster/Ellington, 2-1-condo, \$435/mo. Dave, x38156 or Herb, x38161.

Sale/Lease: Bay Glen, 3-2.5-2, 2-story, form LR/DR, family rm, \$115K or \$1.1K/mo plus dep. 488-8632.

Sale/Lease: Waterfront complex townhouse, 3-2-2 parking spaces, 2 FPL, util rm, FDR, den, wet bar, storage locker, boat slip w/lift, assum 8.75%, \$89.9K or \$1.4K/mo, bills paid, 288-5801 or 326-2221.

Sale: LC, Newport Blvd, 3-2-2, new A/C, fenced, FPL, \$767.9K. Rod, 474-9292.

Lease: Two-story townhouse, 2-2.5-2 parking spaces, W/D hook up, new paint, carpet, 2 pools, security, \$595/mo, plus dep. 280-2028 or 471-8717.

Rent: Lake Travis cabin, private boat dock, central A/C/heat, fully equipped, accommodates 8, wkly/daily \$425/\$85. 474-4922.

## Cars and Trucks

'89 Plymouth Voyager LE, 21K mi, loaded, 3 seats, ex cond, \$11.5K. 474-9292.

'87 Nissan Maxima GXE, 2 tone gray, loaded, sun roof, tinted, tire insurance, 85K mi, \$8.5K OBO. 333-7248 or 480-9544.

'85 Chevy Cavalier, 4 dr, 4 cyl/2.0L, 70K mi, ex cond, \$2.9K. 488-5522.

'74 Volvo 144, good cond, no rust, \$1.4K. Judy, 483-6078.

'88 Toyota Supra, red, 5 spd, pwr sun roof, spoiler, tint, radar, \$11.5K. Jyll, 283-9363 or 335-1366.

'88 Honda Prelude Si, 4WS, 5 spd, 69K mi, \$9K. Jim, 286-1766.

'80 model all electric "Comuta-Car", licensed for the road, 38MPH cruising, 40 mile range, \$1K. 333-3499.

'84 Nissan Sentra, 4 dr, 5 spd, new distributor, tires, battery, plugs, plug wires, A/C, AM/FM, good cond, \$2.3K. Doug, x33399 or 480-2929.

'83 Grand Prix 5.0L V8, loaded, A/C, new tires, new exhaust, stereo/cass, ex cond, \$2.7K OBO. 333-4014.

'91 Chev stock rally rims w/rings, and center caps, \$125. 333-6795 or 925-3210.

'87 Hyundai GLS, 55K mi, pwr sun roof, alloy wheels, red, will sell at NADA loan value plus \$100. x33146 or 280-8164.

'85 Chrysler New Yorker, gun metal blue, 4-dr, 2.2L turbo, loaded, 71.5K mi, \$4.5K. 946-7587.

'81 Chevy Caprice Classic, ex cond, \$1650. 282-6422 or 280-8927.

'80 Mercedes Benz 300SD turbo diesel, 230K mi, good cond, \$5995. Pete, x38672.

'84 Mazda RX7, silver, 5 spd, A/C, cruise, 56K mi, ex cond, \$4250. 335-2371 or 326-2783.

'89 Honda Prelude Si, sky blue, 5 spd, 28K mi, alarm, alum wheels, \$12.5K. 480-9125.

'86 Honda Accord DX, silver, 4 dr, 5 spd, new clutch, new brakes, cruise, AM/FM/cass, \$4995. Debbie, x38631 or 326-2546.

'84 Camaro Z-28, dk blue, ex cond, recent paint and tires, 69K mi, \$4.7K. 283-1954 or 480-8548.

'88 Mallard motorhome 27', loaded, low mi, ex cond, class C, \$28K. 481-0440.

'86 Cadillac Fleetwood Brougham, loaded, ex cond, 63K mi, \$10K. 488-7387.

'89 GMC Suburban, loaded, ex cond, dual A/C. 852-8622.

'87 Chevy Cavalier, 4 dr, PS, PB, AM/FM/stereo cass, low mi, \$3975 OBO. 338-2851.

'82 Ford EXP, 4 spd, 2 seater, good cond, 44K mi, \$1450. x31610.

'85 Toyota MR2, ex cond, 77K mi, \$4.5K. Craig, 283-5311 or 420-2936.

'87 Nissan Maxima GXE, 4 dr, 2 tone pewter, 3L V6, mud flaps, floor mats, moon roof, ex cond, 53K mi, \$9.5K. Ted, 282-2808 or 326-2156.

'89 Honda Civic LX, 4 dr, auto, PW, PD, PB, PS, AM/FM/cass, A/C, new tires, ex cond, \$7.9K. Jay, x35814 or 992-3149.

'89 Mazda MX-6, 5 spd, cruise, A/C, low mi, warranty, ex cond, \$8950 OBO; '84 Buick LeSabre Limited, 97K mi, all pwr, ex cond, \$2850 OBO. Blaine, x32765 or 486-9825.

'81 AMC Concord 4 dr, good cond, A/C, stereo, \$1.2K OBO. 481-0440.

## Cycles

'88 Raleigh Mountain Bike "Chill", like new, 18 spd, \$400 OBO. Blaine, x32765 or 486-9825.

20" Schwinn world sport, \$197. Peter, 334-2081.

'81 Honda XL 185 trail bike, 4 cyl engine, knob-by tires, good cond, \$325. Mark, 538-3001.

Yamaha RZ350, Kenny Roberts replica, professional engine porting, Mikuni carburetors, pipes, K&N jet kit, Dunlop radials, incl bike cover and helmet, \$1995 OBO. Hugo, 333-2552 or 286-0432.

## Boats and Planes

'90 Regal Sebring 185, blue/whit, 175hp, IB/OB Mercruiser w/SS prop, galvanized trlr, 4 yr warranty, always garaged \$10750. x37591 or x35864.

2 windsurfers, beginner and advanced boards, full set up, \$400/ea or \$700/both, sail bags \$10/ea. Michelle, 280-2587.

Sailboat b100-14 w/sails and trlr, \$995. R. Hoover, x31360 or 996-7716.

'82 22 ft Starwind, 4.5 hp Evinrude, stove, dinette, new bottom job, \$6K. Robert, 280-7736.

Lycomeng O-290-D2, 135 hp, 430 SMOH w/Sensenich propeller, \$4K. 333-6599 or 286-7558.

'79 18 ft Baha ski boat w/Johnson 150 hp, doc rail ski tow, galv trlr, incl life jackets, \$4.2K. x34742 or 480-2117.

Welcraft 18.5 ft leisure/ski boat, life vests, skis, 125 hp Johnson motor, VHF radio, ladder, canopy, trlr, seats up to 8 adults, \$1980 OBO. 333-6458.

'89 Sea Ray 160 Bowrider, 100 hp, Mercury O/B, galv trlr, stainless steel prop, garage kept, low hrs, life jackets, Coast Guard equipment, skis, \$8.4K. 280-2539 or 482-0927.

'78 16 ft Welcraft boat w/1150 Mercury O/B, new carpet, tuned up, needs seats, incl sportsman trlr, bimini top, canvas cover, \$3.3K. x344361.

Connely Comp II water ski 65" w/carry case and vest, \$100 OBO. 286-1766.

Boat slip on Clear Lake, w/roof and motorized hoist, for pwr boats, \$125/mo. 474-4922.

## Audiovisual & Computers

Infinity Quantum Jr. speakers, 12 in, 3 way, \$200 OBO. Recoton MTS TV Decoder, \$25 OBO. 286-1766.

Zenith Laptop, 640KB, 20MB HD, 720KB FD, 360KB FD, new 4 hr battery, Panasonic NLQ printer, software w/manuals QuattroPro, Quicken4, Wordstar5, BO. Peter, 334-2081.

XT Clone, 20MB HD, dual floppy, color, \$595. Bob, x34409 or 393-1670.

Magnavox, HQ VCR w/remote, \$125. x33146 or 280-8164.

Apple Monitor green screen III, IIE KB, Epson FX80 printer, loads of SW, games and manuals. Ed Shumilak, x37686 or 326-4795.

Commodore 128, 1581 and 1571 drives, Star 1000 and 1526 printers, mouse, modem, 50 disks, 1000 programs, \$550 all or part. Rick, x33856 or 488-3527.

XT clone, turbo, 2FD, 1HD, graphics, monitor, SW, \$500; Panasonic KX-P1124 24 pin printer, 5 fonts, 3 way paper feed, 192 cps, \$150. 333-7090

## Today

**Asian Pacific program**—The Asian Pacific American Program will host a panel discussion and cultural program at 1:30 p.m. Aug. 16 in Teague Auditorium. The panel, which includes JSC Human Resources Director Harvey Hartman, will discuss "Achieving Excellence in Space Activities: The Human Resources Perspectives." The cultural program will include ethnic dances, music and traditional bridal costumes. Call Pam Adams at x33761 for more information.

**Cafeteria menu**—Special: tuna and noodle casserole. Entrees: broiled codfish, fried shrimp, baked ham. Soup: seafood gumbo. Vegetables: corn, turnip greens, stewed tomatoes.

## Monday

**Contract pricing seminar**—The National Contract Management Association and the University of Houston-Clear Lake are co-sponsoring a seminar on "Estimating Cost and Pricing of Government Contracts" at 7:45 a.m. Aug. 19-21 at the UHCL Bayou Bldg., Rm. 2-532. Cost is \$150 per person, which includes course materials. For registration, call 283-3120 or 283-3122. For more information contact Jean Stell 283-3120.

**Cafeteria menu**—Special: meatballs and spaghetti. Entrees: wieners and beans, round steak with hash browns. Soup: chicken noodle. Vegetables: okra and tomatoes, carrots, whipped potatoes.

## Tuesday

**Cafeteria menu**—Special: fried chicken. Entrees: beef stew, shrimp creole, sweet and sour pork chop with fried rice. Soup: beef and barley. Vegetables: stewed tomatoes, mixed

vegetables, broccoli.

## Wednesday

**AFCEA meets**—The Armed Forces Communications and Electronics Association and the Texas Space Business Roundtable will conduct a joint meeting at 11:30 a.m. Aug. 21 at the Lakewood Yacht Club on NASA Road 1. Rep. Mike Andrews will speak on "Congress and Space." Reservations are due by noon Aug. 19; cost is \$12 for members, \$19 for non-members. For more information, call Veronica Mullins, 283-7342, or Luz Wood, 283-7308.

**Cafeteria menu**—Special: Swiss steak. Entrees: fried perch, New England dinner. Soup: seafood gumbo. Vegetables: Italian green beans, cabbage, carrots.

## Thursday

**SCS meeting**—The Society for Computer Simulation will meet at 11:45 a.m. Aug. 22 at the Lockheed Plaza 3 Bldg., first floor PIC Rm. JSC's Liz Bains will speak on the "Simulation System Branch." No reservations required. For more information, contact Wade Webster, 244-4306, or Robin Kirkham, 333-7345.

**Cafeteria menu**—Special: stuffed bell pepper. Entrees: turkey and dressing, enchiladas with chili, wieners and baked beans. Soup: cream of chicken. Vegetables: zucchini squash, English peas, rice.

## Aug. 23

**Cafeteria menu**—Special: Salisbury steak. Entrees: baked scrod, broiled chicken with peach half. Soup: seafood gumbo. Vegetables: cauliflower au gratin, mixed vegetables, buttered cabbage, whipped potatoes.

## Aug. 27

**BAPCO meeting**—The Bay Area PC Organization (BAPCO) will meet at 7:30 p.m., Aug. 27, at the League City Bank and Trust, 303 E. Main, League City. Contact Earl Rubenstein, x34807, or Tom Kelly, 996-5019, for information.

## Aug. 28

**NMA meets**—The National Management Association will meet at 5 p.m. Aug. 28 in the Gilruth center ballroom. JSC Director Aaron Cohen will speak. Reservations are required by noon Aug. 21. For more information, call Valerie Burnham, x34210, or Carol Turner, x34182.

**BANN meeting**—The Bay Area NAFE (National Association of Female Executives) Network will have its luncheon meeting at 11:30 a.m. Aug. 28 at the South Shore Harbour Country Club. Speaker will be Blanca Gutierrez, owner of Comedy Showcase, speaking on owning and operating a business. For more information, contact Sharon Westerman 486-8972 by July 19.

## Sept. 10

**Hispanic Heritage Program**—The JSC Hispanic Advisory Committee and the Houston/Galveston Hispanic Employment Program Manager's Council will host the second annual Hispanic Heritage Program from 8 a.m.-4 p.m. Sept. 10 at the Gilruth Center. Astronaut Franklin Chang-Diaz will show slides, Ricardo Ampudia will discuss the free trade agreement with Mexico and Edward Valenzuela will present a leadership workshop. Luncheon tickets are \$8. For more information, call Mike Ruiz, x38169, or Denise Navarro, 488-8806.

or 796-0032.

100% IBM compatible, 80286 CPU, 12.5MHz, 1 MB RAM, 3.5" -1.44 MB and 5.25" - 1.2 MB FD, 2400 baud internal modem, Relysis 640 x 480 31 dpi VGA monitor, 49 MB 3.5" Seagate HD (RL, 28ms), 101 key enhanced KB, 3 button Genius mouse, SW, Panasonic KX-1124 24 pin dot matrix printer, good system, \$1.8K. Todd, x33101.

IBM PCjr, 640K, color monitor, printer, needs work, \$290 OBO. Tom, 486-1455.

Mac Plus, 20M HD, 4M RAM, ImageWriter II printer, plus ext drive, SW, ex cond, complete system, work all new SW, \$1.1K. 280-8796.

TI-99A computer w/accessories and cartridges, ex cond, BO. x32084 or 992-1448.

## Musical Instruments

Clarinet, \$100. 488-6917.

Yamaha 215D ele console organ and bench, incl pedals, symphonic chorus, auto arpeggio, and multi bass, \$1.5K OBO. x34231 or 332-1354.

Yamaha console organ, full pedal, ex cond, \$2.5K OBO. Scott, (409) 849-1874 or Kathie, 480-8684.

TASCAM 8 track recorder, 4 DBX's 150's, Tascam M30 mixer, \$3250; Fender bullet bass/case, new cond, \$300; Hammond M3 organ, good cond, \$595. 474-3612.

**Pets and Livestock**

AKC registered tri-color cocker spaniel, housebroken, all shots, male, \$75. 471-4843.

GiGi and golden pheasants, chickens, quail w/pens, feeders, incubators, \$300 OBO. 538-1382.

Golden Retriever, 9 mos, AKC, \$150. x35896 or 488-7982.

Free puppy blk lab/chow-chow mix, 13 wks, female, shots. 929-7208.

AKC Mini Dachshund pups for sale. 486-7111.

Free kittens, 2 blk, 3 wht w/blk spots. Brenda, x36183 or 996-9526.

Free female calico cat, 2 yrs, spayed, all shots. 332-0478.

Free lab mix puppies, 4 girls, 3 boys, 283-5703 or 559-2764.

## Household

2 glass top end tables and coffee table, \$50/ea; 25" color console, \$125; rower/exerciser, \$75. x34072 or 482-7607.

Rust color sofa and love seat, \$100; twin sz headboard, \$15. Queen sz headboard, \$25. 471-4843.

O'Keefe and Merritt under counter dishwasher, good cond, \$50. Robert, 283-4135.

Wht side-by-side refrig, 20 Liter, Mont Ward, \$200; wht Maytag gas dryer, \$80; wht dish washer Mont Ward, \$80. 333-7248 or 480-8544.

22.5 cu ft side-by-side refrig/freezer, harvest god, good cond, \$175. 280-2545.

Frigidaire refrig, side-by-side, brown, \$110.58. Bill, x31167 or 333-9042.

3 drwr chest w/hutch, \$75; Vivitar 80-200mm f4.5 camera lens, used once, \$75; gas lawn edger, 2 stereo speakers, \$25. 482-8820.

Kenmore portable DW, \$200; full sz headboard/footboard, \$75; courtroom legal oak table, \$60; dressing mirror, \$5; slide projector, \$25; Fisher Price baby swing, \$35. x36776 or 286-3266.

Twin boxspring, never used, \$20; child's table w/4 folding chairs, \$10; antique pine plate shelf, \$10. Carl, x32798 or 538-3291.

Couch, love seat, rocking chair, foot stool, coffee table, end table, \$350. 538-1922.

Kenmore Coldspot refrig/freezer, w/ice maker and new compressor, \$390; or smaller refrig, wht, w/ice maker, \$190. 280-5801 or 326-2221.

Dinette set, fold out sofa, B/W 19" RCA TV, color 13" Sony TV, 2 rocker/swivel chairs, lamps. 286-8457.

Peach and beige camelback sofa and love seat designed whierloom damask overlay, less than 3 yrs old, good cond, Scotchguard protected,

\$150/ea. Lisa, 282-5255.

Frigidaire, heavy duty, lg capacity W/D set, wht, ex cond, \$525. Jon, 661-3430.

Sofa, rocker, chair, foot rest, \$100; king sz waterbed, motionless matt, htr, frame, \$100. Ralph, x34736.

## Lost and Found

Lost watch in parking lot of building 13, brand, 'Swatch', blk plastic belt, wht face, message printed "Time Flies". John x34853.

Found male shepherd/chow ? mix, blk w/tan paws, belly, eyebrows, no collar, owner claim or free to good home. 480-7332.

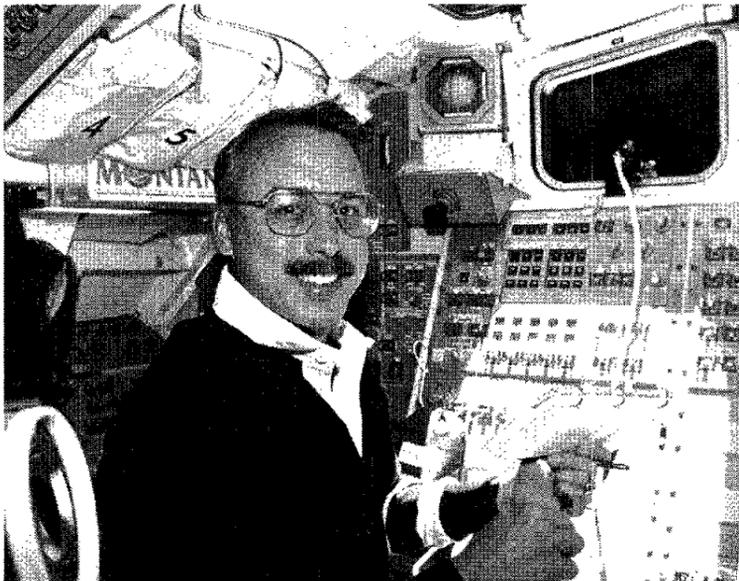
## Wanted

Want to trade Precor 718e stairstepper recently purchased from Physico and/or cash, and/or women's jewelry for IBM compatible computer. 282-6908 or after 5pm 334-4361.

Want roommate, 3-2 house, fully furnished int, W/D facilities, \$225/mo plus 1/3 util. Jay, x35814 or 992-3149.

Want Chevy or GMC truck '79 thru '88, fleet side w/ull 8 ft bed, will have 350 V8 engine, 1/2 or 3/4 ton, regular cab or extended cab, CASH. Cotton, 474-5558.

Want pool riders from Sugar Land



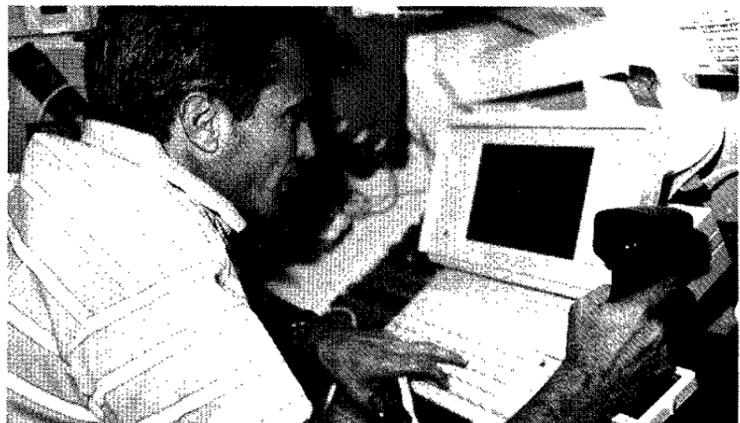
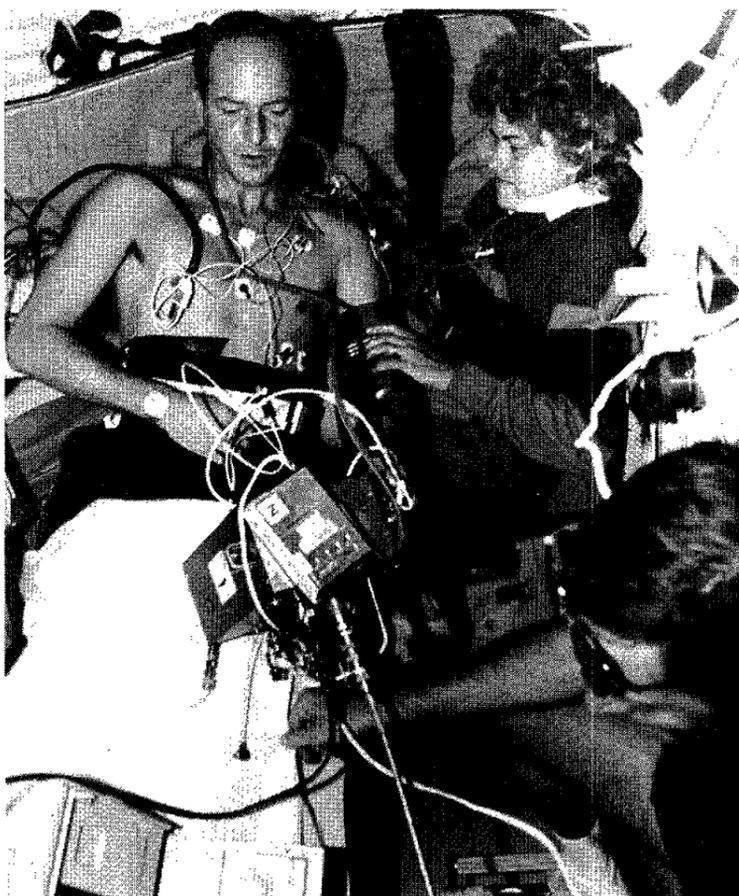
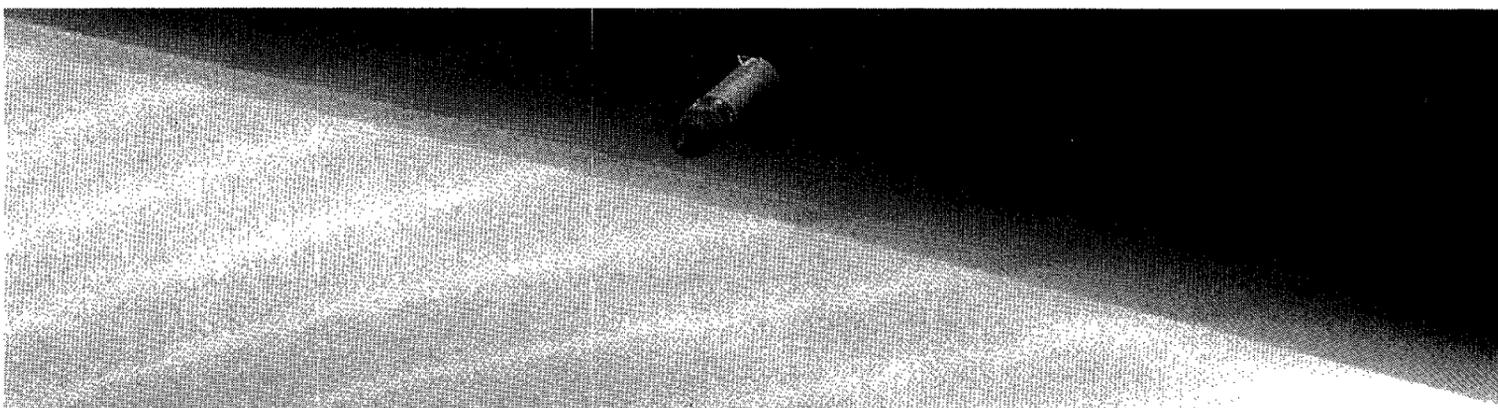
# Nine Days' Duty

## STS-43 photos paint portrait of busy crew

**A**fter nine days in space, the crew of *Atlantis* returned to Earth with knowledge that will add to the capabilities of the shuttle, help the designers of Space Station *Freedom* and bolster databases on how the human body functions in the absence of gravity.

Commander John Blaha, Pilot Mike Baker and Mission Specialists Jim Adamson, David Low and Shannon Lucid deployed the latest addition to the shuttle's satellite communications constellation, tested new shuttle communications technology, put space station radiator technology through its paces, started a controlled fire, performed more experiments in polymer membranes and crystal growth, and looked for ways to help the human body readapt to Earth's gravity.

- Clockwise from top left:
- 1) Adamson shows that Optical Communication Through the Window works and could be a viable alternative to hard-wire communication with outside payloads and standard radio communication with space-walking astronauts;
  - 2) Low runs around the world during his turn on the treadmill that supports Detailed Supplementary Exercise 476, "In Flight Aerobic Exercise." Doctors hope the exercise can help counteract the light-headedness astronauts sometimes feel when they return to Earth;
  - 3) *Atlantis'* external tank falls away after separation;
  - 4) Tracking and Data Relay Satellite-E, soon to become TDRS-West and an integral part of the satellite communications network that supports shuttle flights and satellites such as the Hubble Space Telescope and the Gamma Ray Observatory, is deployed against a spectacular background of clouds;
  - 5) Baker consults his checklist while working with the Space Station Heat Pipe Advanced Radiator Element-II experiment. The crew documented SHARE-II's ability to stand up to extreme temperatures and jostling, something it will need to do if it is to help keep *Freedom* cool;
  - 6) Blaha gives the portable Macintosh computer a whirl, getting a grip on the thumbball/handgrip control device. Crew members tested various cursor control devices for personal computers to get a feel for which will work best on *Freedom*;
  - 7) Low soaks in the Lower Body Negative Pressure device, which resembles a short sleeping bag and helps pull fluids from space farers' upper bodies back to their lower extremities, while Lucid and Baker monitor the experiment's progress. LBNP is another method by which doctors hope to ease the orthostatic intolerance, or light-headedness, felt by people who return to Earth after working in microgravity; and
  - 8) Lucid works with the BioServe Instrumentation Technology Associates Dispersion Apparatus. BIMDA was used to test methods that have commercial potential for growing large, high-quality protein crystals in microgravity. □



# Soviets launch NASA instrument to study ozone hole

The first flight of a NASA ozone instrument on a Soviet spacecraft began Thursday when NASA's Total Ozone Mapping Spectrometer was launched aboard a Cyclone rocket also provided by the Soviet Union.

The Meteor-3/TOMS two-year mission, which launched at 4:14 a.m. CDT Thursday, will make it possible to continue monitoring global ozone levels by measuring the total ozone content in the Earth's atmosphere. Since the first TOMS was launched aboard NASA's Nimbus-7 satellite in 1978, it has provided reliable, high-resolution daily

mapping of global total ozone.

The Meteor-3/TOMS instrument is identical to the Nimbus-7 instrument in terms of optics and performance. By launching in August, Meteor-3/TOMS will be in place to observe the formation of the Antarctic ozone "hole" in September and October. The ozone "hole" is a large area of intense ozone depletion over the Antarctic continent that typically occurs between late August and early October and typically breaks up in mid-November.

The spacecraft was shipped to the launch site at the Plesetsk

Cosmodrome on June 15. TOMS arrived in Plesetsk in early August, NASA is supplying the TOMS instrument and is providing on-board storage for science data. The U.S.S.R. State Committee for Hydrometeorology (Hydromet) is providing the launch and launch vehicle, mission operations and TOMS housekeeping data.

After launch, a Moscow team in the Flight Control Center will control the commands to the spacecraft and every two weeks, personnel from the Goddard Space Flight Center will send via computer the command sequences

for TOMS operations to the U.S.S.R. Central Aerological Observatory. Data will be downlinked to receiving stations at Wallops Flight Facility, Wallops Island, Va., and Obninsk, U.S.S.R., with data analysis performed by NASA and Hydromet. The data will be archived at the National Space Science Data Center, located at Goddard, and at the Central Aerological Observatory of Hydromet, located at Dolgoprudny, Moscow Region.

The project is taking place under the 1987 U.S./U.S.S.R. agreement on "Cooperation in the Exploration and

Use of Outer Space for Peaceful Purposes," as amended, May 1988, and according to an implementation agreement signed by Hydromet and NASA in 1990.

The program management representatives for the mission are Dr. Nikolai Petrov of Hydromet, Moscow, and George Esenwein of NASA Headquarters, Washington, D.C. The technical managers are Vladimir Adasko, Director of the All-Union Scientific Research satellite, and Charles Cote, Goddard Space Flight Center, for the TOMS instrument.

## Atlantis crew lauds support

(Continued from Page 1)

shaped crew patch paid tribute to 30 years of American space flight. "With the support of the American people, we at the Johnson Space Center have a lot more history to write."

Commander John Blaha, who took time out several times during the flight to emphasize the importance of the research being conducted and the need for even better orbiting research facilities, accepted the praise on behalf of the entire crew, his family and a still larger group.

"The bottom line is, America ought to be very proud of all the fine people who work in our aerospace industry, who work in the government all the way from the west to the east coast of America to build this fantastic flying machine we call the space shuttle."

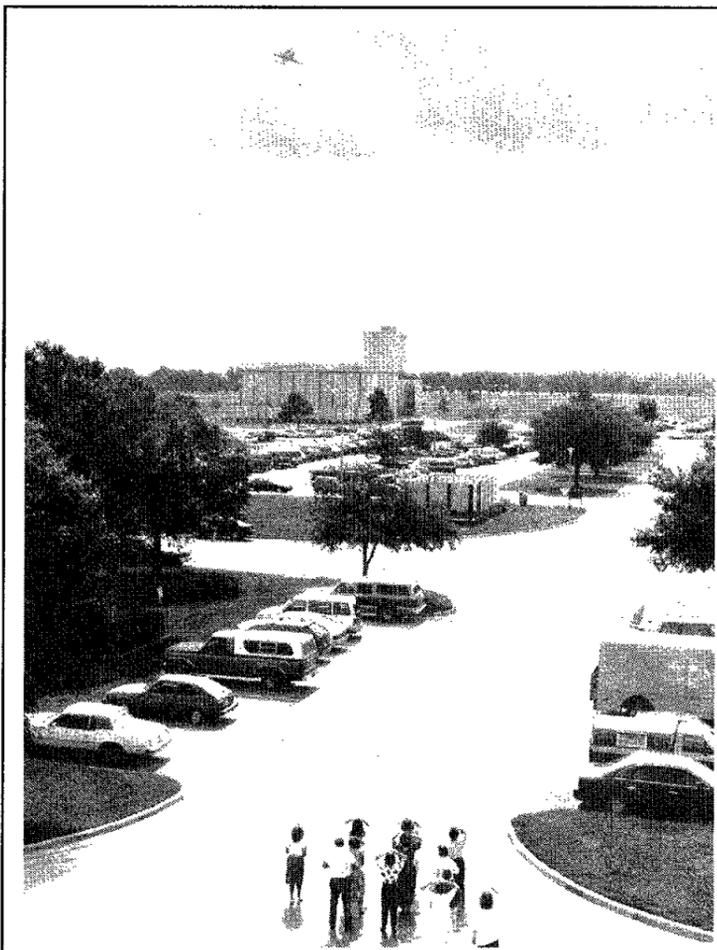
Pilot Mike Baker, returning from his first space shuttle flight, agreed.

"It takes a top-notch group of people to make it operate and to develop the systems and procedures that we use and I know that most of you are probably those people," he said. "We couldn't do it without you."

Mission Specialist Jim Adamson said the orbiter and payloads were so trouble free that the crew was able to "devote literally all of our time to doing our work." He said the success of the mission was due to the dedication of those who supported the effort.

"If the data we accumulated is only half as good as the time we had collecting it, we'll certainly push back the frontiers of technology," Adamson said.

Lucid thanked her family and everyone else who supported the mission. "That says it all, just thanks," she said.



JSC Photo by Jack Jacob

Employees watch from beneath Bldg. 8 as the Space Shuttle *Columbia* and its Shuttle Carrier Aircraft fly over JSC on their way to Rockwell International's Palmdale, Calif., plant.

## Board to eye fuel cell mishap

(Continued from Page 1)

A board has been appointed by KSC Director Forrest McCartney to investigate the cause of the accident.

*Columbia* also was on the move this week, traveling from KSC to Palmdale, Calif., for a more than 40-million-mile factory checkup. The oldest space shuttle will receive a host of modifications and upgrades, including installation of systems that may allow it to remain in space for as long as 16 days.

In addition, *Columbia* will go through a highly detailed structural inspection, searching for signs of wear and tear. The inspections and modifications are planned to be completed by January 1992, and *Columbia's* next space flight will be STS-50, a 13-day mission now set for early June 1992.

On its journey to California,

*Columbia*, atop the Shuttle Carrier Aircraft, made a low fly over of JSC on Monday. After an overnight stop at Kelly Air Force Base in San Antonio, *Columbia* arrived at Palmdale early Wednesday afternoon.

The newest shuttle, *Endeavour*, had its electrical system turned on for the first time this week as part of standard preparations for flight. *Endeavour* is being readied for an April 1992 launch on STS-49. Prior to the launch, however, it will go through a flight readiness firing, a 20-second test firing of the main engines at the launch pad, in mid-March 1992.

*Endeavour* is now in Bay 1 of the processing hangar, and other work this week included an inspection of the drag chute upgrade, servicing of the freon coolant loops and inspections of the main propulsion system.

## U.S., Argentina sign space cooperation pact

Vice President Dan Quayle and Argentine President Carlos Menem recently signed an agreement for cooperation in the civil uses of space, with special emphasis on Earth and space sciences.

The agreement, signed in Buenos Aires, Argentina, establishes a framework for future cooperative space projects between NASA and the newly formed Argentine National Commission on Space Activities (CONAE).

During the same ceremony, U.S. Ambassador to Argentina Terence A. Todman and Raul F. Matera, the Argentine Secretary of State for Science and Technology, signed an agreement to cooperate in a solar physics and astrophysics satellite mission, Satellite de Aplicaciones Cientificas-B (SAC-B). SAC-B will be the first joint spacecraft mission undertaken by NASA and a Latin American country.

The SAC-B mission will advance the study of solar physics and astrophysics through the examination of high energy, hard X-ray emissions from solar flares and cosmic gamma-ray burst sources and the examination of the spectrum and intensity of the diffuse, low energy,

soft X-ray cosmic background radiation.

By studying x-rays from solar flares, U.S. and Argentine scientists expect to learn about the explosive acceleration of particles that occurs during solar flares. The diffuse x-ray cosmic background comes from the million-degree gas that can be found in the space between stars, and SAC-B data will be used to investigate the nature of the gas.

By obtaining the precise time of arrival of cosmic gamma-ray bursts at SAC-B and comparing it to times measured on interplanetary spacecraft, scientists can precisely locate sources of gamma-ray bursts. The sources of cosmic gamma-ray bursts will remain a mystery until identified with an object seen at other wavelengths.

Under the SAC-B agreement, CONAE will build the spacecraft, and the Institute of Astronomy and Space Physics will provide a solar X-ray instrument. NASA will provide an X-ray cosmic background instrument built by Penn State University and X-ray spectrometers provided by Goddard Space Flight Center. SAC-B will be scheduled for launch on a U.S. expendable launch vehicle.

## JSC chooses Florida company to fill maintenance contract

By Pam Alloway

JSC has signed a contract with Johnson Controls Inc. of Cape Canaveral, Fla., to provide maintenance and operational services at JSC's institutional plant facilities.

The major responsibilities covered in the contract include plant operations and maintenance, special purpose equipment maintenance, maintenance and operations support, and analysis and documentation.

The cost-plus-award-fee contract covers a basic year plus four one-year options. The basic performance period is Nov. 1, 1991, through Oct. 31, 1992.

The value of the contract for the basic year is \$18.6 million. If the options are exercised, the contract value for the options will be \$18.8 million for the first option, \$19.5 million for the second, \$19.6 million for the third and \$20.4 million for the fourth and last option.

## JSC, San Jacinto offer fall semester courses on site

The Human Resources Development Branch has scheduled several on-site fall semester courses in cooperation with San Jacinto Community College.

A San Jacinto representative will be at JSC from 1-2:30 p.m. Wednesday in Bldg. 45, Rm. 203, to register employees for the classes. Courses will include English Com-

position II, 3-6 p.m. Tuesdays, Sept. 3 through Dec. 17; American Government I, 5-8 p.m. Wednesdays, Sept. 4 through Dec. 18; and Intermediate Algebra, 5-8 p.m. Thursdays, Sept. 5 through Dec. 19.

All classes will be conducted in Bldg. 45, Rm. 251.

For more information, call Estella Gillette at x33077.

## Space News Roundup

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Editor ..... Kelly Humphries  
Associate Editors ..... Pam Alloway  
Kari Fluegel

## Energy plan targets wasteful personal computer use

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percent per gross square foot of floor space by fiscal 1995.

But since 1987, JSC's energy consumption trend has been in the opposite direction, increasing by 3 percent a year. In 1990, JSC consumed nearly 1.2 British thermal units (the amount of heat required to raise the temperature of a pound of water one degree Fahrenheit) per GSF. By the 1995 deadline, JSC's energy use is supposed to be down to just over 1 million Btus.

"It's going to be a tough battle," Gilbreath said. "But through some fairly significant facility systems modifications, we will be able to reduce energy consumption a great deal."

A key factor in the upward trend in energy use is the advent of personal computers. The first 700 personal com-

puters came on line at JSC in 1987, and that's when a downward trend that started with post-1973 energy crisis conservation was reversed.

COD Plant Engineering Division Chief Keith McQuary said that since then, JSC has acquired between 6,000 and 7,000 personal computers and 600 laser printers. Each PC requires very little area, but adds a heat load equivalent to three people.

"We have 6,000 PCs and since one PC generates as much sensible heat as three people, it's like adding 18,000 people," McQuary said, "and the heat load from 18,000 people is significant."

The problem is compounded by the fact that there were no personal computers at JSC in 1985.

"The reason PCs are such a big impact here is because if you go back

to the base year of 1985, which all these energy savings have to be based on, there wasn't the large population of PCs we have today," said Chuck Gieck, Electrical Operations Branch chief. "We have to be able to apply power and cooling to these PCs and yet still save energy at the same time. It becomes a double problem we have to deal with."

Cohen thanked all NASA and contractor employees for their enthusiastic participation since the last energy conservation push in January 1990, when budgetary reductions were the impetus.

Employees have helped the center conserve electricity by suggesting that some lights be turned off in offices, along streets and in parking lots, Gilbreath said, but some of the greatest offenders in the energy conservation battle still are those employees who

don't turn off their computers when they're not in use, particularly those who leave them running overnight and during weekends.

Personal computers account for about 4 percent of JSC's energy use, Gilbreath said.

Plant Engineering already has identified some improvements to facility systems that will provide greater efficiency in handling the heat load being put out by those computers, such as variable air volume air conditioning, which puts cool air where it is needed most with better sensing and diffusion, and variable volume chilled water pumps that reduce the flow of chilled water to areas that don't need as much cooling, said Dennis Perrin, chief of the Mechanical Operations Branch.

JSC also is combating energy waste

by incorporating energy efficiency into its new buildings through the use of no windows, as in Bldg. 46 and the new Space Station Control Center, or highly reflective windows, as in Bldg. 4 South now under construction, and more energy-efficient roofs.

System improvements and new energy efficient buildings can help reduce JSC's overall gross square foot energy usage, but they are expensive in a time of budget belt-tightening, he said.

"The new buildings are more energy efficient than the older ones, therefore the added free space will help toward attaining our energy conservation goal, but we're not at all sure it's enough to offset the energy load that computer equipment has added to the center," Gilbreath said.